IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re the Application of: **Noriko SAKASHITA**	Group Art Unit: **1713**
Serial Number: **10/730,887**	Examiner: **Dr. Kelechi C. Egwim**
Filed: **December 10, 2003**	Confirmation Number: **5155**

For: **PROCESSING AID FOR VINYL CHLORIDE RESIN AND VINYL CHLORIDE RESIN COMPOSITION**

Attorney Docket Number: **000466A**
Customer Number: **38834**

REPLY BRIEF

Mail Stop: Appeal Brief – Patents   December 30, 2005
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the Substitute Examiner's Answer mailed November 3, 2005, Appellant submits the following Reply Brief.

APPELLANT'S ARGUMENT

Claims 1-4 remain rejected under 35 U.S.C. §102(b) as being anticipated by or, in the alternative, 35 U.S.C. §103(a) as being unpatentable over Tuzuki et al. (U.S. Patent No. 4,179,481), Matsuba et al. (U.S. Patent No. 5,093,420, EP392465 or GB 1378434).

Appellant respectfully disagrees with rejections under both §§102 and 103. Appellant notes that none of the cited references, alone or in proper combination, disclose every claimed limitation. Appellant submits that the rejection under 102 is not appropriate, and submits that the rejection of the present claims under 103 has been overcome by appropriate showing of unexpected results.

Independent claim 1 and dependent claims 2-4 are grouped and represented by the independently claimed subject matter of claim 1, which is characterized by:

A processing aid having a specific viscosity of η_{sp} of at least 0.5, the processing aid being obtained by polymerizing

1-50 parts of monomer mixture (B) and

99-50 parts of a latex copolymer having a specific viscosity of η_{sp} of at least 0.7.

The latex copolymer is previously obtained by polymerizing

99 to 50 parts by weight of a monomer mixture (A).

Monomer mixture (A) comprises

51 to 100% by weight of methyl methacrylate,

0 to 49 % by weight of at least one monomer selected from the group consisting of a methacrylate ester except methyl methacrylate and an acrylate ester, and

0 to 20 % by weight of a vinyl monomer copolymerizable therewith.

Appellant emphasizes the following ten statements in response to the Examiner's Supplemental Answer and the rejections:

1) The present invention is a two-stage polymer having a final specific viscosity (η_{sp}) of at least 0.5 *as measured in chloroform*, wherein the first stage has a η_{sp} of at least 0.7 *as measured in chloroform*. The difference and conversion between measurement in chloroform and measurement in benzene is described in the Declaration dated March 19, 2002. As noted in the Declaration, η_{sp} of 0.51 in benzene = η_{sp} of 0.24 in chloroform. Therefore, where the prior art teaches a "η_{sp} of at least 0.5" as measured in benzene, the prior art is teaching a value of at least 0.24 when converted to the claimed chloroform method.

2) Based on the above conversions, the prior art does not teach the claimed minimum specific viscosities; instead, the prior art teaches that the minimum viscosities may be significantly lower than the claimed minimum first- and second-stage η_{sp}.

3) Because the prior art teaches broader acceptable ranges than Appellant, and because the claimed range produces unexpected results, Appellant submits that there is no anticipation. MPEP §2131.03 indicates that when the prior art discloses a range that

overlaps the claimed range, but no specific examples falling within the claimed range are disclosed, a case-by-case determination must be made as to anticipation. In order to anticipate the claims, the claimed subject matter must be disclosed in the reference with "sufficient specificity to constitute anticipation under the statute." The MPEP then indicates that if the claims are directed to a narrow range, the reference teaches a broad range, and there is evidence of unexpected results within the claimed narrow range, depending on the other facts of the case, it may be reasonable to conclude that the narrow range is not disclosed with "sufficient specificity" to constitute anticipation of the claims. Appellant submits that the claimed range and prior art ranges *overlap*, that *no examples* are in the claimed range, that the claims are directed to a *narrower range than the prior art*, and that there is *evidence of unexpected results* associated with the claimed range but not the prior art range. Therefore, Appellant submits that there is no anticipation.

4) Both the Examiner, in his Supplemental Answer, and the Board, in the Remand mailed September 28, 2005, have questioned why Appellant used Comparative Example 5 of Matsuba et al. as a comparison data point, instead of other examples. Because the first-stage viscosity would have to be individually calculated for each example selected, Appellant selected the single example in the prior art that met all of the components limitations of the claims and had the highest final viscosity, which would give the example the greatest chance of having a first-stage viscosity in the

claimed range (at least 0.7"). Appellant notes that among all of the references, Matsuba et al. in Comparative example 5 teaches the highest final viscosity by far; the next closes final viscosity exhibited is Example 10, which has only 68% of the final viscosity of Comparative Example 5. Other examples, (including Examples 1 and 3, questioned by the Board, and Example 10, questioned by the Examiner), have only 58%-64% of the final viscosity of Comparative Example 5. Because of this, Comparative Example 5 was deemed as the only example in the prior art that could possible have been formed from a first-stage polymer of at least 0.7, as claimed. Experimental results in the Declaration of March, 2003 showed that even Comparative Example 5 failed to meet the claimed first-stage viscosity. Furthermore, Comparative Example 5, by meeting all of the claimed limitations with the exception of first-stage viscosity, is a useful example to help prove the unexpectedly superior results associated with meeting both the claimed first- and second-stage viscosities.

5) None of the examples or descriptions of the cited references disclose a first-stage η_{sp} of at least 0.7. The only one that comes close, as noted above, is Comparative example 5 of Matsuba et al., which first-stage viscosity is 0.64 in chloroform as directly calculated by experiment as shown in the Declarations. In spite of meeting all of the other limitations of the present claims, it is still proven inferior.

6) The invention is not merely a two-stage polymer having the claimed final-stage viscosity. Rather, the invention is a product having the claimed viscosities first and final stage viscosities so that it will exhibit proper processability, including cloud value, transparency, and formability. If only the final viscosity mattered, then merely raising the final viscosity regardless of the first-stage viscosity. This is proven not to be the case. It is clear that the first-stage viscosity substantially affects the properties of the final invention. Therefore, the first-stage process limitations can not be disregarded.

7) There are unexpectedly superior results shown for a two-stage polymer having an η_{sp} of at least 0.5 *wherein the first stage has η_{sp} of at least 0.7*, as shown in Table 4 and as augmented by Comparative example 5 of Matsuba et al. As noted in the Declaration of March, 2003, the first-step polymer obtained in Comparative Example 9 of the present invention, the first-step polymer and the second-step polymer obtained in Comparative Example 10 and the first-step polymer obtained by EXPERIMENT in the Declaration have lower specific viscosity than the claimed specific viscosity of the present invention. It is shown that when these polymers are used as processing aids for poly (vinyl chloride), satisfactory transparency, gelation property and foamability are not obtained. Accordingly, it is shown that satisfactory transparency, gelation property and foamability can **not** be obtained when at least one of specific viscosity of the first-step polymer and the second-step polymer is lower than the claimed specific

viscosity of the present invention. This result, in light of the teachings of the prior art, is unexpectedly superior.

Summary

Appellant submits that the rejection of the present claims under 102 is not appropriate, and submits that the rejection of the present claims under 103 has been overcome by appropriate showing of unexpected results. Appellant respectfully solicits reversal of the rejections under 35 U.S.C. §§ 102 and 103.

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If any additional fees are due in connection with this submission, please charge Deposit Account No. 50-2866.

Respectfully submitted,

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Attachments: Detailed description of experimental design and results supporting Statements No. 4 and 5 of the present brief

APPENDIX A

Detailed description of experimental design and results supporting Statements No. 4 and 5 of the present brief

In Example 1 of Matsuba et al. (US 5,093,420), a reactor was charged with 0.03 part of potassium persulfate as a polymerization initiator and a monomer mixture (A) of 64 parts of methyl methacrylate and 16 parts of butyl methacrylate was added over 4 hours continuously, completing the first stage polymerization, and then the reaction mixture was added a monomer mixture (B) of 11 parts of butyl acrylate and 9 parts of methyl methacrylate over 1 hour continuously, obtaining a final stage polymer. The obtained final polymer has a specific viscosity of 3.00 (in benzene).

As described in col. 8, lines 44-54 of Matsuba et al., polymers obtained in Examples 2, 3 and Comparative Examples 1 to 6 are prepared according to the same process in Example 1, except that an amount of potassium persulfate is changed in order to control a specific viscosity of the final resulting polymer. Among Examples 1-3 and Comparative Examples 1-6, an amount of potassium persulfate is smallest in Comparative Example 5 (0.01 part) and the specific viscosity of the obtained final polymer is 5 (in benzene), which is the largest of all. In the case a specific viscosity of the final polymer is the largest, the viscosity of the first stage polymer is also considered to be the largest.

As described in lines 26 to 35, col. 10 of Matsuba et al., polymers obtained in Examples 4-6 and Comparative Examples 7-10 are prepared according to the same process in Example 1, except that a ratio or an amount of monomers are changed. Also, as described in col. 11, lines 22

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to 30 of Matsuba et al., polymers obtained in Examples 7-11 and Comparative Examples 11-14 are prepared according to the same process in Example 1, except that a ratio or an amount of monomers are changed. That is, in these Examples and Comparative Examples, since an amount of potassium persulfate as a polymerization initiator is the same as in Example 1 (0.03 part) and the polymerization process is the same too, the obtained polymers are considered to have approximately the same specific viscosity (3.00 in benzene).

Therefore, a person skilled in the art can reasonably find that the first stage polymer obtained in Comparative Example 5 has the largest specific viscosity of all the Examples. That is why Comparative Example 5 of Matsuba et al. was demonstrated in the Declaration dated March 19, 2002. According to the Declaration, the specific viscosity of the first stage polymer obtained in Comparative Example 5 of Matsuba et al. is 0.64 and that of the final polymer is 0.58 (in chloroform), and thus all the specific viscosities of the stage polymers of the two-stage polymers disclosed in Matsuba et al. are considered to be lower than 0.7, which is outside the scope of the Claim 1 of the present application.

In Example 1 (sample number (1)) of Tuzuki (US 4,179,481) or GB 1378434, a reactor was charged with 0.1 part of ammonium persulfate as a polymerization initiator and 80 parts of methyl methacrylate was added over 4 hours continuously, completing the first stage polymerization, and then the reaction mixture was added a monomer mixture of 13 parts of ethyl acrylate and 7 parts of methyl methacrylate over 1 hour continuously. The resulting final stage polymer has a specific viscosity of 1.60 in benzene, which corresponds to 0.36 in chloroform.

As described in lines 3 to 4, col. 10 Tuzuki, polymers in Example 3 (sample polymers (5) to (12)) are prepared according to the same process in Example 1. Also, as described in lines 24 to 25, col. 11, polymers in Example 4 (sample polymers (13) to (19)) are prepared according to the same process in Example 1.

Further, in Example 6 of Tuzuki, a reactor was charged with 0.1 part ammonium persulfate as a polymerization initiator and a mixture of 75 parts of methyl methacrylate and 10 parts of butyl methacrylate was added over 4 hours and 15 minutes continuously, completing the first stage polymerization, and then the reaction mixture was added a monomer mixture of 5 parts of methyl methacrylate and 10 parts of ethyl acrylate over 45 minutes continuously, obtaining a final stage polymer. The resulting final polymer has a specific viscosity of 1.65 in benzene, which corresponds to 0.37 in chloroform. The sample polymers disclosed in Table 7 and 8 are prepared according to the same process in Example 6.

Therefore, the two-stage polymers disclosed in Tuzuki and GB 1378434 have fully low specific viscosities, which are lower still than that of the polymers disclosed in Matsuba et al.

As above, though specific viscosities of the first stage polymers of the two-stage polymers disclosed in Tuzuki and GB 1378434 are not specifically described, they are apparently lower than that of the polymers in Matsuba et al., and therefore lower than 0.7, which is outside the scope of the Claim 1 of the present application.